# iRobot Scooba® Service Manual

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**EUROPE:**

**Scooba (grey bumper)**

- *385*

**USA:**

**Scooba (blue bumper)**

- *330/335/340 (5800)*

**Scooba (grey bumper)**

- *350 (6000)*
- *380 (6050)*

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iRobot®

# Table of Contents


***Scooba Service Process*** ***4***

01: Customer Call 4
02: Scooba Return Procedure 5
03: Incoming Scooba Inspection 6
04: Scooba Software Download 7
05: Scooba Built-in-Test (BiT) 7
06: Scooba Built-in-Test Data Capture 7
07: Scooba Service (Fix or Replace) 7
08: Scooba Battery Test 8
09: Scooba Power Supply Test 8
10: Virtual Wall Test 8
11. Re-Pack Scooba 8

***Scooba Floor Washing Robot*** ***9***

**Scooba Terminology** **9**
Normal behavior 11
End of cycle – drying mode 12
Scooba – Bottom Chassis 13
Scooba – Top Chassis 14
Scooba – Tank and Brush 15

**Service Procedure (based on Built-in-Test)** **17**
BiT 0 - Panel LEDS 17
BiT 1 – External Watch Dog Test 17
BiT 2 – Bumper switch and Board rev 18
BiT 3 – Side Cliff Sensors 18
BiT 4 – Front Cliff and Wall Sensors 19
BiT 5 – Side Wheel Drops 19
BiT 6 – Front Wheel Drop & Stasis 20
BiT 7 – Tank, Filter and Cleaning Head Sensors 21
BiT 8 – Light Sensor 22
BiT 9 – RCON Infrared Receiver 22
BiT 10 – Main Brush 22
BiT 11 – Vacuum 23
BiT 12 – Pump 24
BiT 13 – Tank Level Sensors 25
BiT 14 to 15 – Left & Right Wheel 26
BiT 16 – Wheel Encoders 26
BiT 17 – Charger Detector 27
BiT 18 – Battery Sensor 27
BiT 19 to 23 – Charger tests 27
BiT 24 – Software Version 27

***Scooba Accessories*** ***28***

**Scooba Battery** **29**
General Battery Maintenance Tips 30
Battery Troubleshooting 30

**Scooba Power Supply** **31**
Power Supply Troubleshooting 32

**Scooba Charger Base** **33**

Charger Base Troubleshooting 33

**Scooba Virtual Wall 34**
Virtual Wall Troubleshooting 35

***Appendix A: Troubleshooting Flowchart via Telephone 36***

***Appendix B : User Panel Lights 37***
Service Light 37
Power Button and Light 37
Clean Button and Light 37
Check Tank Light 38
Check Brush Light 38
I'm Stuck Light 38

***Appendix C: Scooba Serial Number Format 39***

***Appendix D: Scooba Error Codes 40***

***Appendix E: Scooba OSMO 45***
OSMO Download Procedure 45

***Appendix F: Scooba Built-in-Test 46***
Scooba Built-in-Test Procedure 46
iRobot Data Capture 50
Alternative Data Capture (without iRobot software) 50

***Appendix G: Scooba Built-in-Test Limits 51***

***Appendix H: Battery Test Procedure 52***

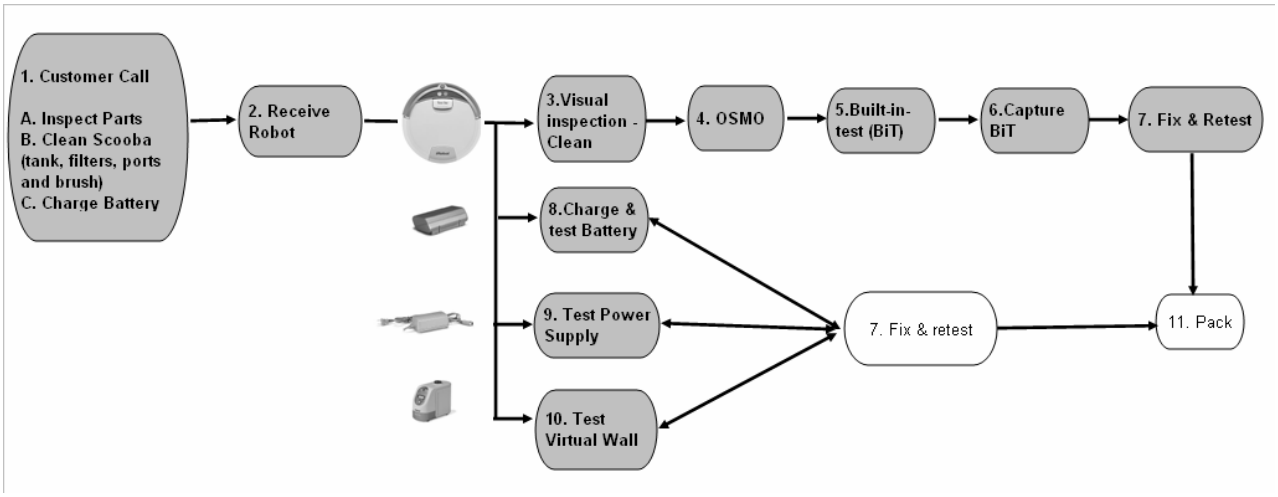
***Appendix I: Power Supply Test Procedure 53***

***Appendix J: Suggested Maintenance Procedure 54***
Scooba Dry Vacuum Squeegee Replacement 54
Scooba Cleaning Head Disassembly 55
Scooba Wheel Replacement 56
Scooba Chassis Disassembly 57

***Appendix K: Glossary 61***

# Scooba Service Process

This manual details the steps of a Scooba Service Procedure.



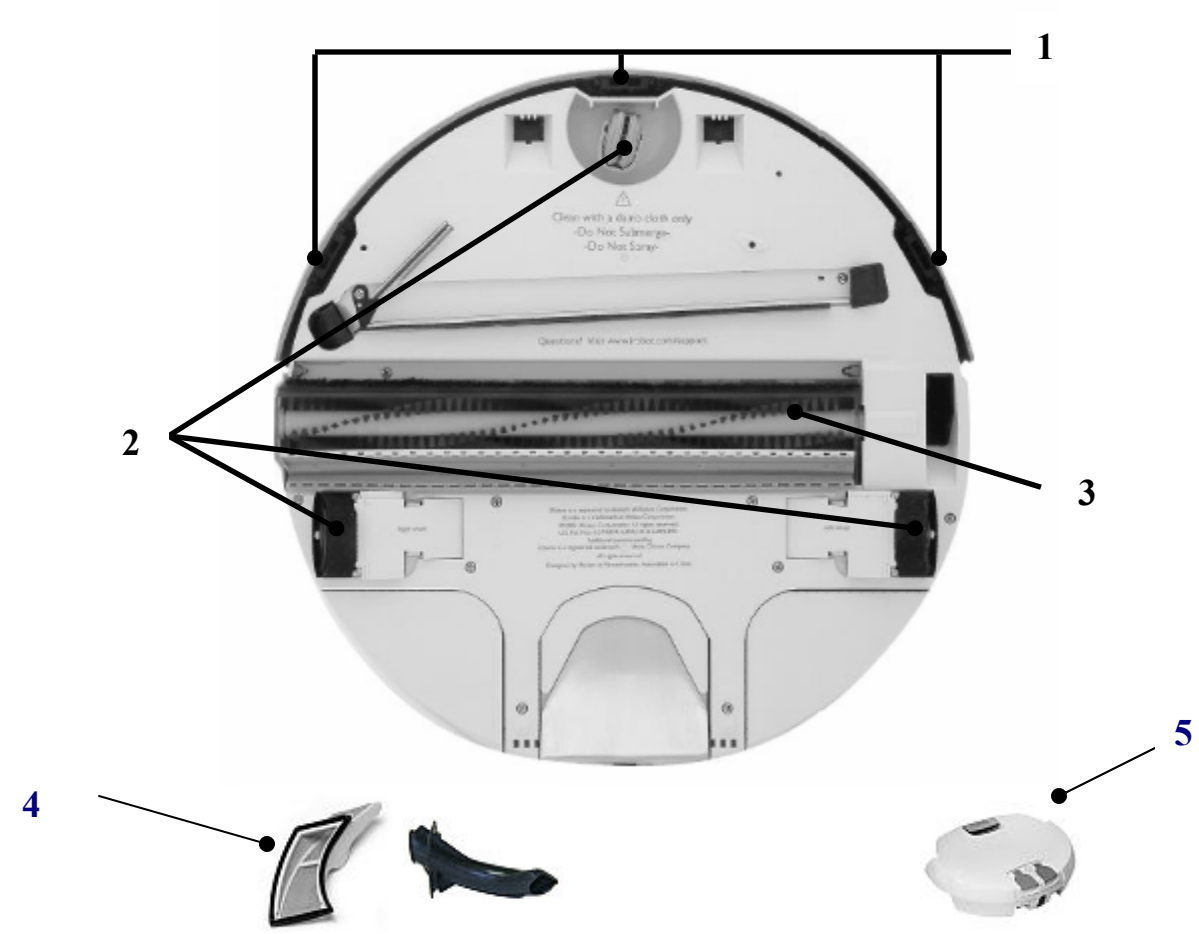

## 01: Customer Call

Scooba issues can be examined over the telephone by guiding a customer through a troubleshooting process (see Appendix A and Appendix D). At a minimum, the customer should be asked to perform the following troubleshooting steps:

A) Inspect proper placement of :
   1. Brush, Battery, Filter, Vacuum Flow Tube, and Tank

B) Clean Scooba
   1. Clean the cliff sensors under the bumper with compressed air.①
   2. Remove any hair or obstruction from the wheels.②
   3. Remove any hair or obstruction from the brushes.③
   4. Clean out the filter and tube.④
   5. Rinse the tank and refill the clean before running. ⑤

C) Perform a 'Battery Reset' (not applicable to customers that use a Charging Base).
   1. Unplug Scooba from Power Supply and take the battery out.
   2. Press the POWER button for 5 seconds
   3. Reseat the Battery.
   4. Wait 5 seconds and plug the Power Supply into Scooba.
   5. Charge the Battery fully.




## 02: Scooba Return Procedure

If the initial troubleshooting steps do not solve the issue, have the customer send the Scooba and all accessories to a service repair center. The customer should add documentation that provides the date, their name, address, a reference number and a description of the complaint.

- Avoid receiving a depleted Battery. Ask customer to remove the Battery from Scooba and place it separately in the box.

- Avoid water leakage during shipment. Ask customer to drain the Tank and place it in a thin plastic bag before shipping.

## 03: Incoming Scooba Inspection

| | |
|---|---|
| Perform a general outer visual inspection of Scooba's condition. Look for wear on the Bumper and Wheels. | |
| Remove the Tank and ensure that the Filter and the Vacuum Flow Tube are properly inserted.<br><br>Tank:<br>o Add water into both dirty and clean Tank. Shake and pour out.<br>o Add water through the four bottom Tank ports. Shake and pour out.<br><br>Filter and Tube:<br>o If dirty, clean the Filter and Tube through running water. | <br> <br> |
| Inspect the Brushes:<br>o Ensure the cleaning head is properly inserted in the chassis.<br>o If dirty, open the cleaning head and clean the brush. | |
| Inspect the Wheels:<br>o Inspect the drive Wheels. Bounce and turn them for equal resistance.<br>o Inspect front Caster. Make sure it spins freely, pivots and rotates. Remove the wheel and look for dirt. | <br> |
| Inspect the Cliff and Wall Sensors:<br>o If dirty, clear them with compressed air. | |

| | |
|---|---|
| o Reinsert the Scooba components.<br>o Insert a charged Battery in Scooba<br>o Add some water in the clean Tank.<br>o Run Scooba and see if it ends immediately with an error code. | Appendix D |

## 04: Scooba Software Download

| | |
|---|---|
| Download the latest software, if applicable. Make sure Scooba has a charged Battery. | Appendix E |

## 05: Scooba Built-in-Test (BiT)

It is important that this step only diagnose Scooba failures. For this reason, do not conduct the BiT test with customer accessories as these can be tested separately.

| | |
|---|---|
| Insert a charged Battery in Scooba. | |
| Verify that the Filter and Tube are inserted in Scooba. | |
| Insert an empty Tank. | |
| Perform BiT steps. (Use known working Power Supply, Virtual Wall and Remote) | Appendix F |

## 06: Scooba Built-in-Test Data Capture

| | |
|---|---|
| Use '**iRobot Factory Test Client Version 1.1'** to capture BiT. | Appendix F |

## 07: Scooba Service (Fix or Replace)

| | |
|---|---|
| **Repair parts using Built-in-test Fix Steps.** | Service Procedure chapter |
| Retest the BiT and continue fixing until BiT passes. | Appendix F |

## 08: Scooba Battery Test

| | |
|---|---|
| Fully charge the returned Scooba Battery. | |
| Test the returned Battery<br>o Battery Voltage Test<br>o Battery Voltage Drop Test | Appendix H<br>&<br>Battery chapter |
| Optional : Discharge the Battery by running it in a Scooba or using a battery discharger (discharge the Battery at a constant 2.9V to 1V per cell). The discharge time should be about 60 minutes. If not, replace the Battery. | |

## 09: Scooba Power Supply Test

| | |
|---|---|
| Test returned Power Supply<br>o Output Voltage<br>o Solid green light under load | Appendix I<br>&<br>Power Supply chapter |
| If the Power Supply light is off or blinking while charging, replace the Power Supply. | |

## 10: Virtual Wall Test

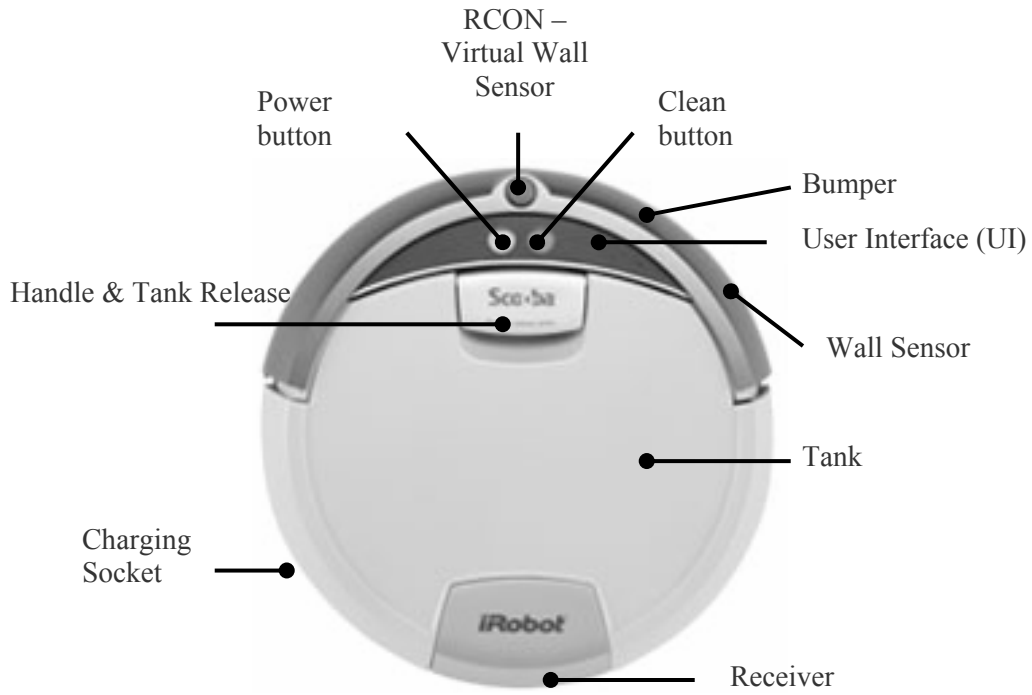
| | |
|---|---|
| Test returned Virtual Wall<br>o Insert charged batteries, if its light is blinking<br>o Clean Virtual Wall (IR emitter) | Troubleshoot Virtual Wall (pg 37) |

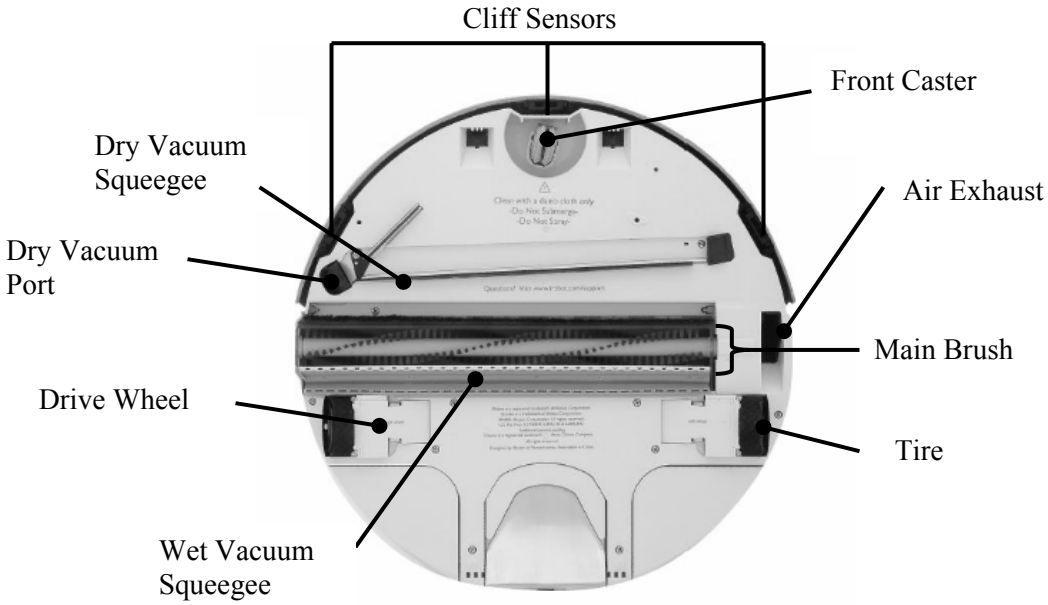
## 11. Re-Pack Scooba

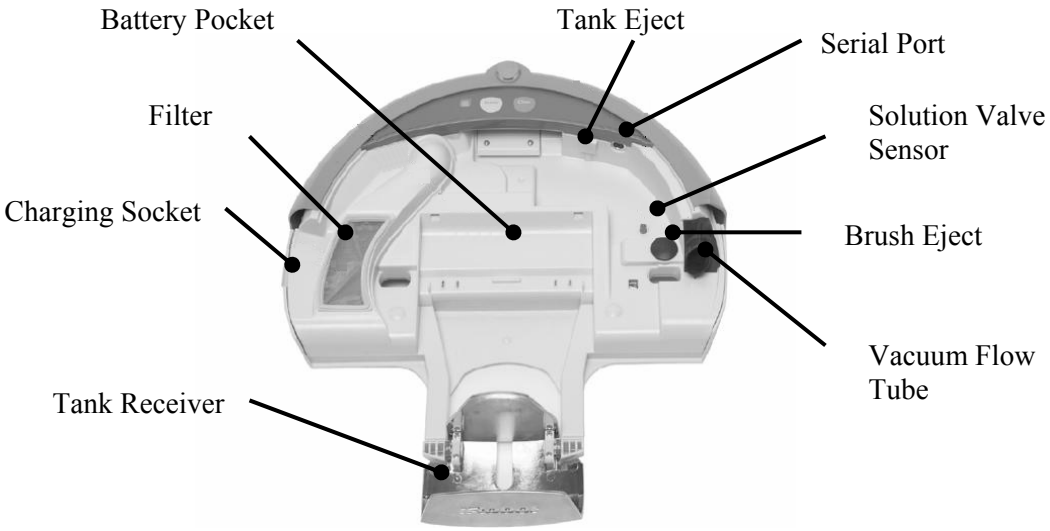
| | |
|---|---|
| To avoid depleting the Battery during shipment, do not ship Scooba back with the Battery inserted in Scooba. Wrap the Battery separately.<br><br>Also, remove any water left in the Tank. Use the Scooba Bulb to remove the water that will not come out<br>naturally. | |

# Scooba Floor Washing Robot

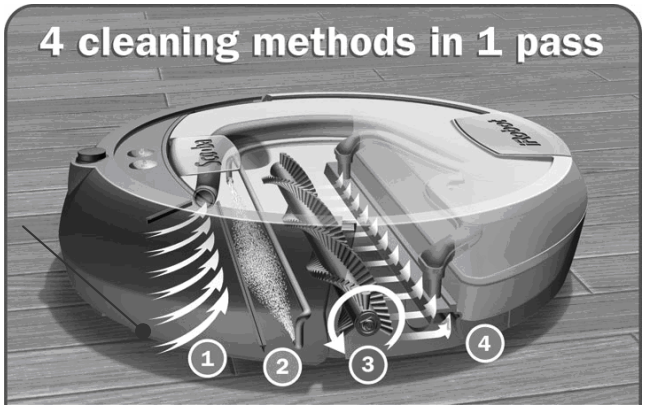
## ***Scooba Terminology***




Battery Pocket
Tank Eject
Serial Port
Filter
Solution Valve Sensor
Charging Socket
Brush Eject
Vacuum Flow Tube
Tank Receiver

## ***Scooba Cleaning Methods***




1. Dry vacuum – air flow directs loose dirt into tank
2. Washing – liquid is deposited on the floor from the clean tank
3. Scrubbing – brush gently scrubs floor to remove dirt on floor
4. Wet vacuum – vacuum sucks up liquid into the dirty tank

While Scooba cleans, it calculates the best path to clean the floor. The cleaning cycle may last between 5 and 45 minutes. Before it ends the cleaning cycle, Scooba will enter a 5-minute drying mode that dries its brush and cleaning system. The Scooba will end the clean cycle either due to an empty clean tank, a full dirty tank or a low battery. Scooba will not run if at startup these termination causes have not been resolved.

Scooba can be used on tile, linoleum, vinyl, marble, slate and sealed hardwood floors, but all grout and seams need to be sealed. Scooba should not be run on carpets, laminate or unfinished/unsealed floors as these floors may be damaged by water (unsealed floors do not contain a layer of polyurethane that protects the sub-flooring from water damage).

### Normal behavior

In normal cleaning behavior, Scooba switches between 4 different behaviors:

- Drive – Scooba drives straight
- Spiral – Scooba drives in an outward spiral pattern
- Bounce – Bumper activation makes Scooba back up, turn in place, and drive straight
- Wall follow – Scooba follows along a wall

When first started, Scooba runs the pump for up to 3 seconds, and then goes into spiral mode (if the ‘clean’ button is held down for an extended period of time at start up it will drive straight and skip the spiral mode). When the bumper is activated for the first time, Scooba goes into wall-follow mode. Thereafter, when the bumper is activated Scooba will normally do a bounce, but will revert to wall-follow mode every 10 to 15 bumps.

There are other behaviors that react to specific situations

- Cliff-avoid – Scooba backs up and turns whenever its cliff sensor detects a cliff
- RCON-avoid – Scooba turns whenever the RCON sensor detects an infrared beam
- Bump-follow – Scooba follows a wall with its bumper
- Escape spin – Scooba will spin in place when a drive wheel is stuck or when Scooba moves straight for 4.5 meters without triggering its bumper of cliff sensors.

There is special control of brush, pump and drive motors:

- The brush is deactivated when Scooba backs up, and re-activated as it moves forward.
- The pump is deactivated when Scooba is turning in place or backing up.
- The pump and brush is deactivated when Scooba is in drying mode.
- If the drive wheel is overcurrenting, Scooba will stop all motors for one second at a time for up to 5 times. If it stays stuck for too long, it will shut down with a beep error code.

## End of cycle – drying mode

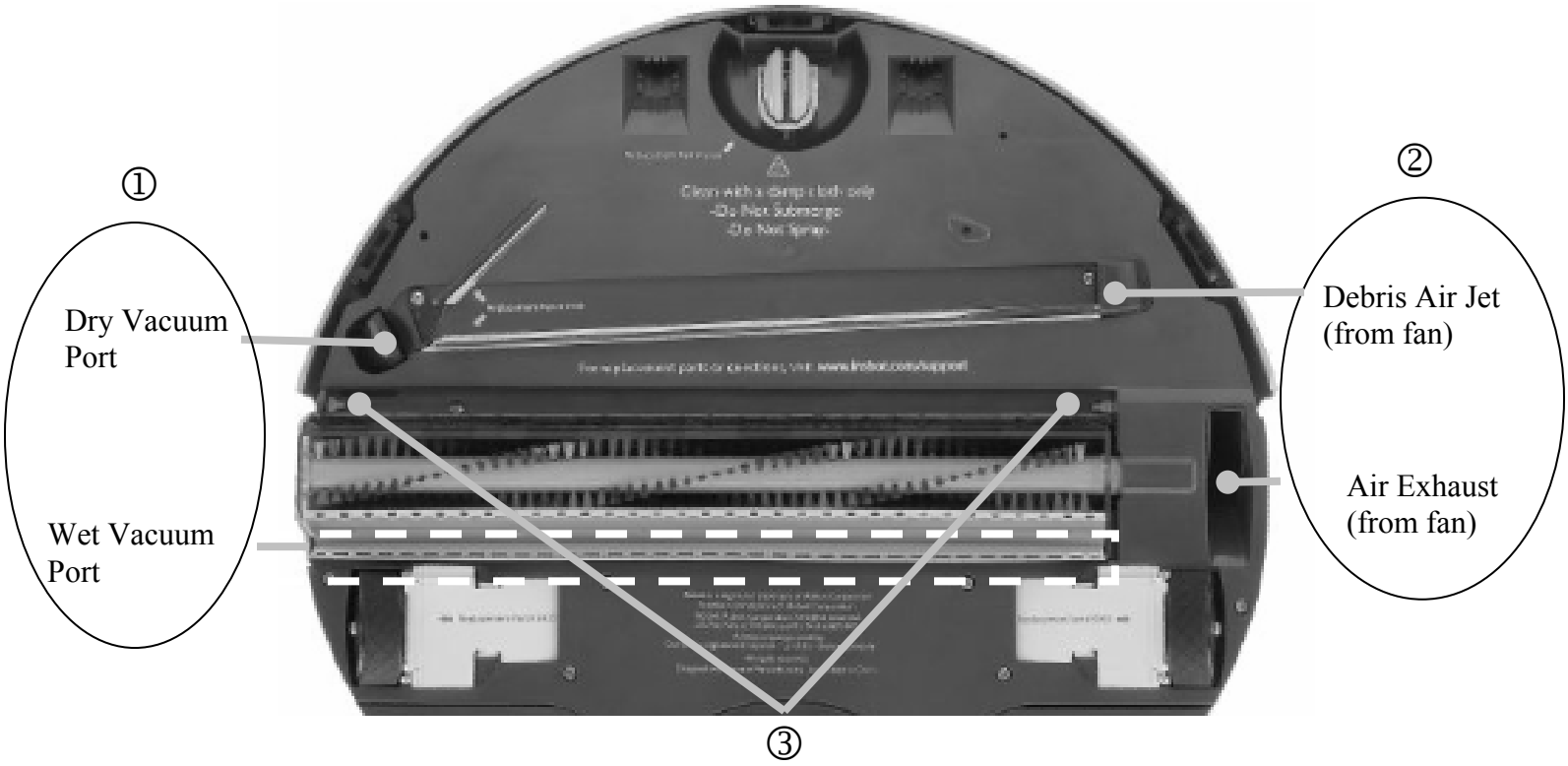
At the end of the cycle, Scooba will enter a 5 minute dry mode designated by a blinking CLEAN button. It enters dry mode in the following conditions:

- when the CLEAN button is pressed while running,
- when the clean Tank becomes empty,
- when the dirty Tank becomes full,
- before the Battery runs out of power.

In this mode, Scooba drives at normal speed with the pump and brush motor off for 5 minutes.

## Scooba – Bottom Chassis

1) Suction : There are 2 suction inlets, the ‘Dry Vacuum Port’ and the ‘Wet Vacuum Port’, which trails the Main Brush. All incoming dirt must take those two inlet paths.
2) Air Outlet : There are 2 air exhausts, the ‘Debris Air Jet’ and the ‘Air Exhaust’. The exhausted air has been filtered and is free of dirt.
3) Water Outlet : Water is deposited on the floor via two nozzles in front of the main brush.

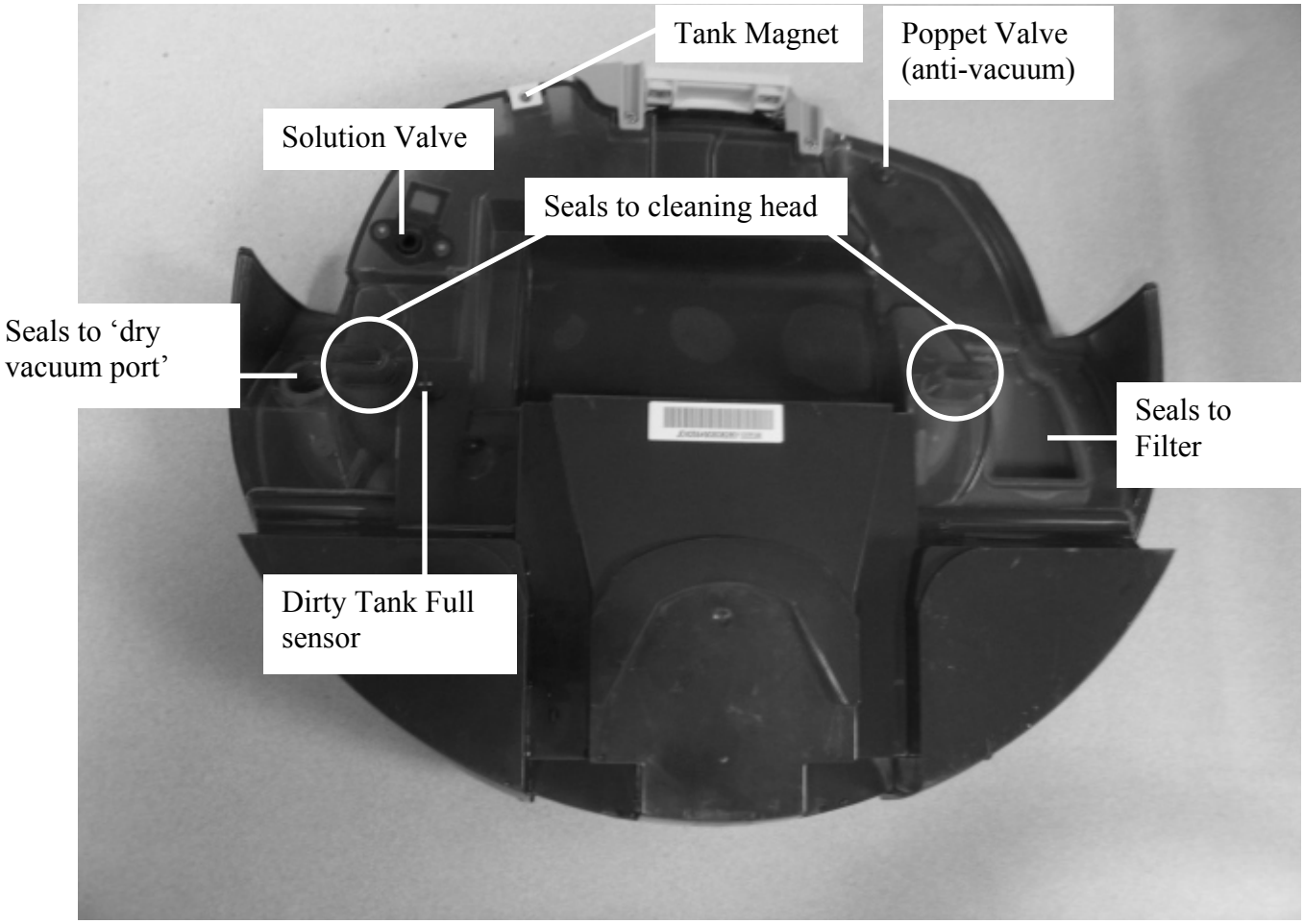


## Scooba – Top Chassis

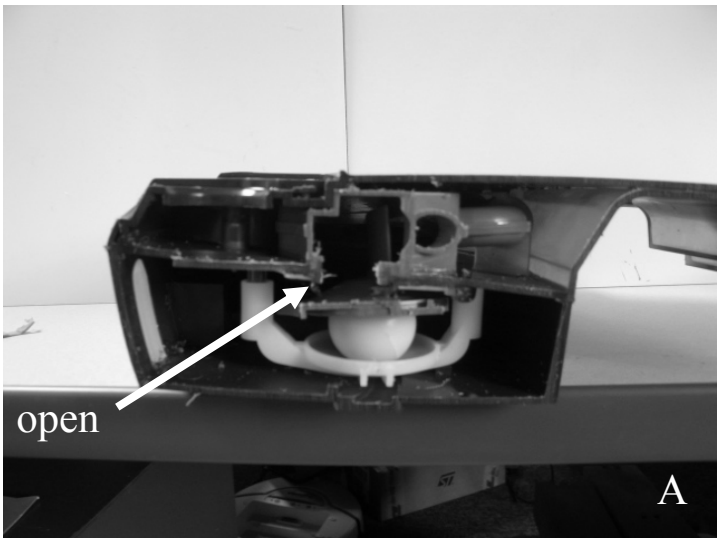
[Water] clean Tank to jet nozzles
[Air/water] 'wet vacuum port' to tank
[Air] dirty Tank to fan
[Air] 'dry vacuum port' to dirty Tank
iRobot
Scooba

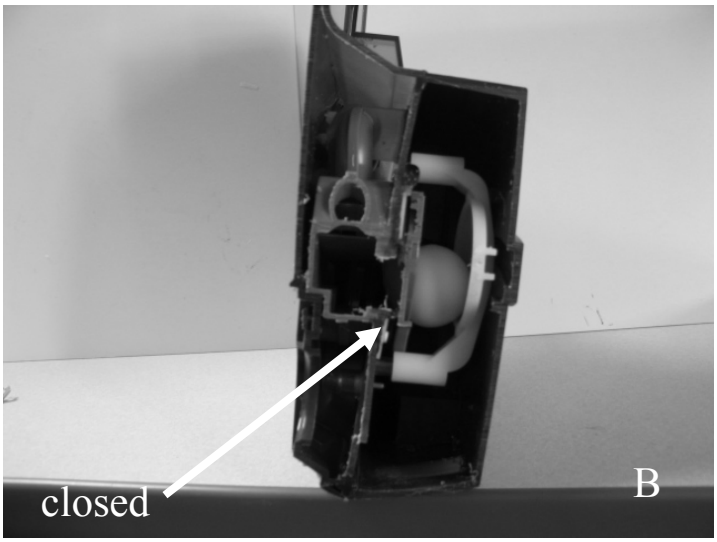
## Scooba – Tank and Brush

When viewing the Tank from below, the transparent part holds clean liquid while the opaque part holds dirty liquid. The clean Tank can hold up to one liter of fluid.



All suction from the floor is directed into a compartment in the Tank that has a 'ball check valve'. The valve is open when the Tank is in the horizontal position as shown in the cross section of the tank below (A). When the valve is open, heavy material (water and dirt) is allowed to pass into the dirty Tank while light material (air and hair) moves passed the Filter to the impeller fan. The valve is closed when the tank is in the vertical position. (B).




Note : A customer needs to transport the Tank by holding the tank vertically from the tank handle. If the tank is flipped on its side or spun around, water from the dirty tank will spill out of the tank ports.

## ***Service Procedure (based on Built-in-Test)***

Every Scooba that is serviced is required to undergo a Built-in-Test (BiT) which will then dictate how to best service the Scooba. A Scooba needs to pass the BiT before being returned to a customer.

The following Service Procedure is based on failed BiT steps or specific Scooba symptoms. Basic troubleshooting steps are detailed but as a last resort, a replacement part is suggested.

### BiT 0 - Panel LEDS

| | | |
|---|---|---|
| **BiT REPAIR STEPS** | Customer complaint :<br>o Scooba lights do not turn on;<br>o Scooba enters BiT when power is started. | |
| | → Press both buttons on the user panel and make sure they snap in and out. If not, replace user interface panel. | |
| **REPLACEMENT PART** | **Scooba Core Robot** | |

### BiT 1 – External Watch Dog Test

This step does not require tester interaction. The robot performs a self-check to verify that the Scooba processor can reset if it gets locked up.

## BiT 2 – Bumper switch and Board rev

| | | |
|---|---|---|
| **BiT REPAIR STEPS** | Customer complaint :<br>o Scooba may push longer and harder on walls;<br>o Scooba ends with an error “uh-oh and 3 beeps”. | |
| | → Does the bumper compress and release freely? | |
| **REPLACEMENT PART** | **Scooba Core Robot** | |

## BiT 3 – Side Cliff Sensors

| | | |
|---|---|---|
| **BiT REPAIR STEPS** | Customer complaint :<br>o Scooba does not detect a cliff ;<br>o Scooba gives an “ehh” error on start up;<br>o Scooba backs up and spins;<br>o Scooba ends with an error “uh-oh and 4 beeps”. | |
| | → Does the bumper compress and release freely?<br>→ Visually inspect under the bumper edges for debris. Clean the cliff sensors with compressed air or a cotton swab | |
| **REPLACEMENT PART** | **Scooba Core Robot** | |

## BiT 4 – Front Cliff and Wall Sensors

| | | |
|---|---|---|
| **BiT REPAIR STEPS** | Customer complaint :<br>o Scooba does not detect a cliff ;<br>o Gives an "ehh" error on start up;<br>o Scooba backs up and spins;<br>o Does not follow walls;<br>o Scooba ends with an error "uh-oh and 4 beeps". | |
| | → Does the bumper compress and release freely?<br>→ Visually inspect under the bumper edges for debris.<br>→ Clean the cliff and wall sensors with compressed air or a cotton swab | <br> |
| **REPLACEMENT PART** | **Scooba Core Robot** | |

## BiT 5 – Side Wheel Drops

| | | |
|---|---|---|
| **BiT REPAIR STEPS** | Customer complaint :<br>o Scooba ends with an error "uh-oh and 1 beep". | |
| | → Inspect the drive wheels and test if they depress and spring out. | |

| | | |
|---|---|---|
| **REPLACEMENT PART** | **Scooba Core Robot** | |

## BiT 6 – Front Wheel Drop & Stasis

| | | |
|---|---|---|
| **BiT REPAIR STEPS** | Customer complaint :<br>o Scooba ends with an error "uh-oh and 1or 2 beeps"<br>o Scooba goes "ehh". | |
| | → Inspect front wheel and make sure the wheel can pivot, rotate and swivel. Remove the wheel module and inspect for damage or debris. | |
| **REPLACEMENT PART** | **Scooba Front Caster**<br><br>**OR**<br><br>**Scooba Core Robot** | <br> |

## BiT 7 – Tank, Filter and Cleaning Head Sensors

<table>
<tr><td rowspan="5">BiT REPAIR STEPS</td><td>Customer complaint :<br>o ‘Check Tank’ light comes on;<br>o ‘Check Brush’ light comes on.</td><td></td></tr>
<tr><td>→ Tank Present Sensor: A magnet located in the front of the tank triggers a reed switch inside the user interface panel. This prevents the robot from running without a tank.</td><td> </td></tr>
<tr><td>→ Filter Present Sensor: A magnet located on the filter triggers a reed switch inside the robot. This prevents the robot from running without a filter, which could damage the vacuum.</td><td> </td></tr>
<tr><td>→ Brush Present Sensor: A magnet located on the top of the cleaning head triggers a reed switch inside the robot. This prevents the robot from running without a cleaning head assembly, which would cause poor cleaning performance.</td><td> </td></tr>
<tr><td>→ If a magnet is missing from tank, filter or cleaning head housing, insert a magnet</td><td></td></tr>
<tr><td>REPLACEMENT PART</td><td>Replace magnets (if missing)<br><br>OR<br><br>Scooba Core Robot</td><td> </td></tr>
</table>

## BiT 8 – Light Sensor

Most Scoobas do not have a light sensor and this step can be skipped by pressing the CLEAN button.

## BiT 9 – RCON Infrared Receiver

| | | |
|---|---|---|
| **BiT REPAIR STEPS** | Customer complaint :<br>o Scooba passes an activated virtual wall. | |
| | → Do a visual inspection of the RCON and wipe any dirt.<br>→ Test the RCON using a Roomba remote. Once Scooba is powered on, then the remote can be used to select a clean mode or move it directionally. | |
| **REPLACEMENT PART** | **Scooba Core Robot** | |

## BiT 10 – Main Brush

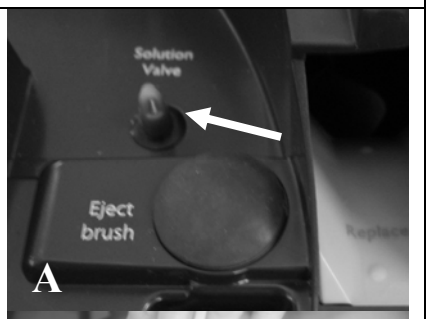
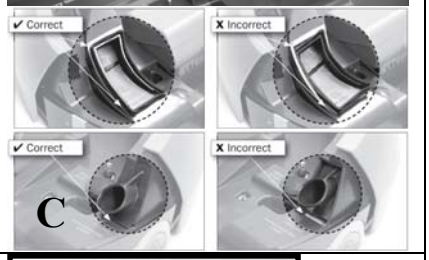
| | | |
|---|---|---|
| **BiT REPAIR STEPS** | Customer complaint :<br>o Floor is dirty;<br>o Main brush is not turning or loud;<br>o 'Check Brush' light is on. | |
| | → Open and remove cleaning head and look for obstructions.<br>→ Do a visual inspection of the cleaning head and check it is installed properly. Replace if damaged.<br>→ If brush is not turning or the motor/gearbox are broken, replace Brush Motor module. | |

| | | |
|---|---|---|
| | **Scooba Core Robot** | |

## BiT 11 – Vacuum

| | | |
|---|---|---|
| **BiT REPAIR STEPS** | Customer complaint :<br>o Floor is too wet;<br>o Scooba is screeching loudly;<br>o Scooba ends with an alarm and 2 beeps. | |
| | → While Scooba is running, determine if air is being exhausted onto the floor (bottom left hand side of robot). This is an indication that the impeller fan is working.<br>→ If Scooba vacuum fan sounds loud, replace vacuum module.<br>→ Inspect the Filter. A broken Filter may have allowed dirt to enter the fan. Replace if punctured. | |
| **REPLACEMENT PART** | **Scooba Filter**<br><br>**OR**<br><br>**Scooba Core Robot** | <br> |

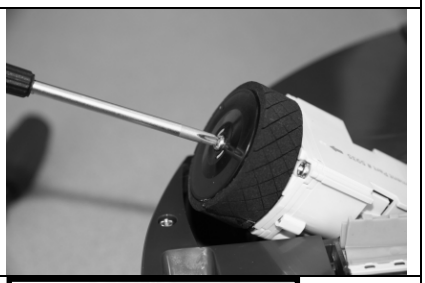
## BiT 12 – Pump

| | | |
|---|---|---|
| **BiT REPAIR STEPS** | Customer complaint :<br>o Scooba does not clean floor / floor is dry;<br>o Scooba ends with an alarm and 1 beep | |
| | → Inspect the solution sensor. Replace if broken or clogged (see A)<br>→ Use a Scooba bulb and push air through the pump system at least three times (see B). Replace the tank and re-start Scooba.<br>→ Check that the **Filter** and **Vacuum Flow Tube** is installed properly (see C).<br>→ Increase the conductivity of the water in the Clean Tank by adding water with 60 ml vinegar, or a little salt or soap to the clean tank water to increase the conductivity of the water. |  <br> <br>  |
| **REPLACEMENT PART** | **Scooba Core Robot** | |

## BiT 13 – Tank Level Sensors

<table>
<tr><td rowspan="3">BiT REPAIR STEPS</td><td>Customer complaint :<br>o ‘Check Tank’ light is on.</td><td></td></tr>
<tr><td>Sensor Background :<br><br>→ Clean Tank Empty Sensor (see A): Two stainless steel pins in Scooba’s solution valve measure electrical resistance of fluid and confirm that water is present in the tubes. The robot runs as long as it sees fluid across the sensor.<br><br>→ Dirty Tank Full Sensor (see B): Two stainless steel pins in the dirty tank measure fluid resistance to determine when the dirty tank is full.</td><td> </td></tr>
<tr><td>→ Make sure the dirty sensor wire is not dirty.<br>o Clean the dirty tank full sensor with a cotton bud as shown (B)<br>o Clean contacts that plug into the dirty tank full sensor (C).<br>o Clean and rinse Tank<br>→ Increase the conductivity of the water in the Clean Tank by adding water with 60 ml vinegar, or a little salt or soap to the clean tank water to increase the conductivity of the water.</td><td> </td></tr>
<tr><td>REPLACEMENT PART</td><td>Scooba Tank</td><td> </td></tr>
</table>

## BiT 14 to 15 – Left & Right Wheel

| | | |
|---|---|---|
| **BiT REPAIR STEPS** | Customer complaint :<br>o Scooba is not driving straight;<br>o Scooba is driving in circles;<br>o Scooba gives an error of "uh-oh and 5 beeps".<br>o Wheels sound loud. | |
| | → Check the tires for wear. Confirm they turn with equal resistance.<br>→ Optional : unscrew the two tires and check for debris on the inside of the wheel (see A).<br>→ Remove the front caster and inspect for debris. |  |
| **REPLACEMENT PART** | **Scooba Core Robot** | |

## BiT 16 – Wheel Encoders

| | | |
|---|---|---|
| **BiT REPAIR STEPS** | Customer complaint :<br>o Scooba circles, stops, circles;<br>o Scooba circles and backs up;<br>o Scooba ends with "uh-oh and 5 beeps" | |
| | → A dirty encoder causes a type of circle dance.<br>→ A broken encoder causes it too back up a distance, circle and so forth | |
| **REPLACEMENT PART** | **Scooba Core Robot** | |

## BiT 17 – Charger Detector

→If this step fails, try again with known good Power Supply. If the problem persists, replace Scooba.

## BiT 18 – Battery Sensor

→ This step does not require tester interaction. If the step fails, try again with another charged Battery. If problem persists, replace the Battery.

## BiT 19 to 23 – Charger tests

→ This step does not require tester interaction. If the step fails, try again with another Power Supply. If problem persists, replace Scooba.

## BiT 24 – Software Version

→ This step does not require tester interaction.

# Scooba Accessories

**Battery**

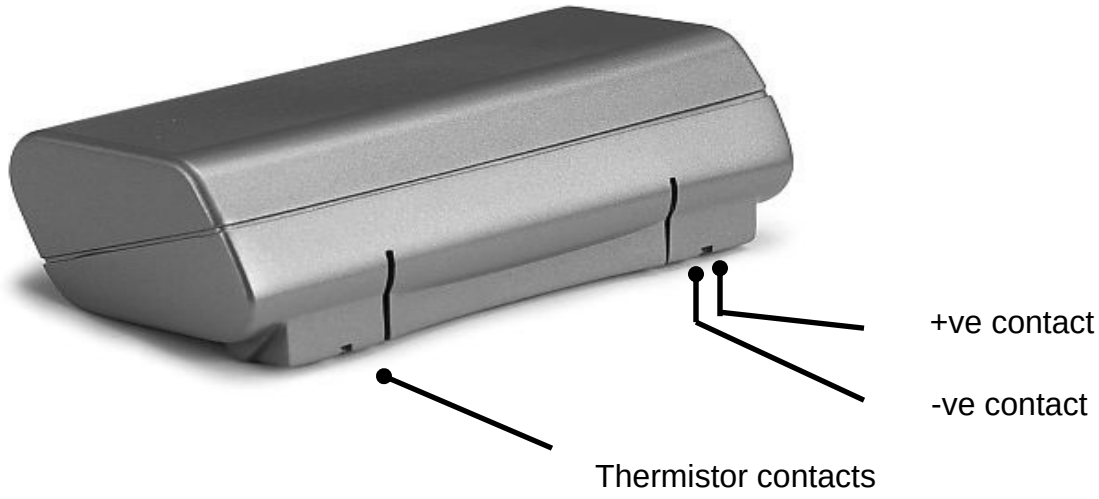
**Power Supply**

**Charger Base**

**Virtual Wall**

## ***Scooba Battery***

Scooba is powered by a rechargeable NiMH (nickel metal hydride) battery made up of 12 cells. A Scooba battery can be charged in the Scooba or the Scooba Charger Base. Normally, a charged Scooba battery has a voltage between 15.5 to 18 V. If the voltage falls below 10.8 V, Scooba will enter a 'reconditioning mode' during charging that takes 16 hours to complete and should not be disrupted. In this recondition mode, the Scooba power light will pulse faster than when in regular charge mode. The battery also has a thermistor which is sensitive to temperature and relies on the change of resistance to measure battery temperature.



## General Battery Maintenance Tips

- **Battery Storage -** For best battery performance, Scooba's battery should be stored in a cool, dry place immediately after charging completes. While charging battery in Scooba, leave the Tank off or wide open to keep the battery cool. If Scooba will not be used for two weeks or more, it is best to unplug the power supply, remove the battery, and store the battery in a cool, dry place.

- **Battery Life -** Fully charge Scooba's battery (3 to 4 hours) before each cleaning cycle. When fully charged, Scooba's battery will always last longer than a full Clean cycle.

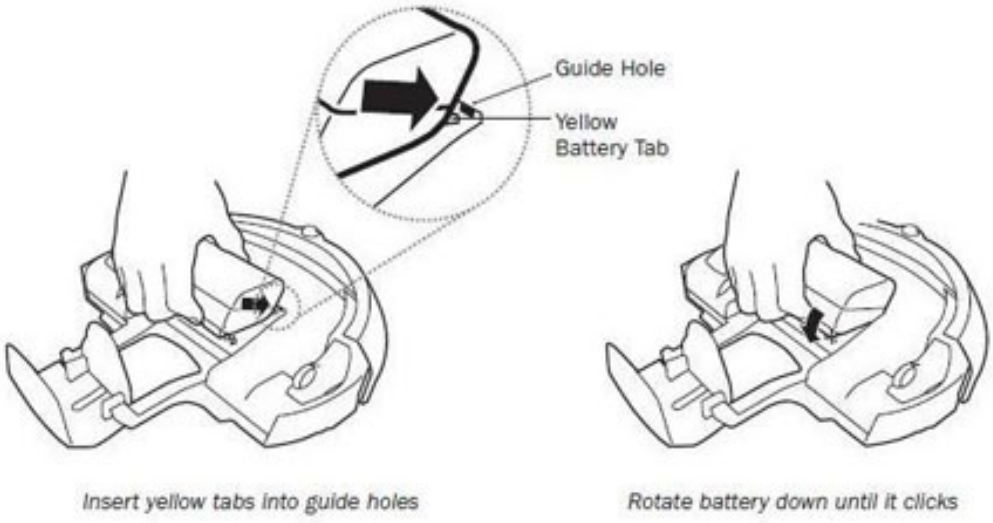
- **16-Hour Refresh Charge -** With regular use, Scooba's battery will fully charge in about 3 hours. In some circumstances, a longer, 16-hour refresh cycle will be required. This longer charge reconditions the battery when it is depleted, and helps extend Scooba's battery life.

## Battery Troubleshooting

- **Problem : C**harging in hot conditions may cause the battery to overheat and Scooba will stop charging until the battery cools down. In this on and off situation, Scooba may not accurately monitor the battery's capacity and result in a short runtime. **Fix**: Do a 'Battery Reset'. Remove Scooba from the Power Supply, pull out the Battery, wait 5 seconds, reseat the Battery, wait 5 seconds, and replug the Power Supply.

- **Problem :** Batteries will discharge when left in the Scooba as there is a sleep current of 11 mA. **Fix** : Keep the battery out of Scooba if not plugged into the Power Supply.

- **Problem :** Batteries are not easy to insert and many users will not seat battery properly. If the battery is not inserted well, the tank will not seal properly. **Fix** : Proper battery insertion requires user to rotate the battery into its slot, making sure the yellow battery tabs fit inside the guide holes. User should listen for a click as the battery snaps into place.



## ***Scooba Power Supply***

Scooba is charged with either a Universal (100-240V) or Domestic (120V) Power Supply. The Power Supply steps the voltage down to 22VDC and 1.75A. The solid green power light on the Power Supply is an indication that it is plugged in and operating properly.

There are 3 phases to the normal charging algorithm.

1. The first phase is a full current charge (1.75A).
2. The second phase is a low current charge (430 mA).
3. The final phase is trickling (11 mA). Note: older software code was set at 50 mA.

There is also a reconditioning charge that will occur if the battery voltage is less than 10.8V. In this mode the battery will be charged at 430 mA for 16 hours.

| Charging Mode | Current | Termination Reasons : |
|---|---|---|
| Cooling Mode | 0 | • **Timeout:** 2 hours<br>• Battery temperature ≤ 40° C |
| Recondition Mode | 430 mA | • **Timeout:** 16 hours<br>• **Overvoltage:** Battery voltage > 1.8V/cell or >21.6V<br>• **Overtemperature:** Battery temperature > 60° C |
| Charge Mode | 1.75 A | • **Timeout:** 4 hours<br>• **Inflection**: Battery voltage slope dips > 1.25mV/min for 60s.<br>• **dT/dt**: Battery temperature rising > 0.7° C per minute<br>• **Peak voltage**: Battery voltage slope < 0mV/min for 60s.<br>• **Hi-res voltage dip**: Battery voltage dips > 10mV when above 15V.<br>• **Low-res voltage dip**: Battery voltage dips > 60mV<br>• **Overtemperature:** Battery temperature > 60° C<br>• **Overvoltage:** Battery Voltage > 21.6V |
| Low Current | 430 mA | • **Timeout:** 1 hour |

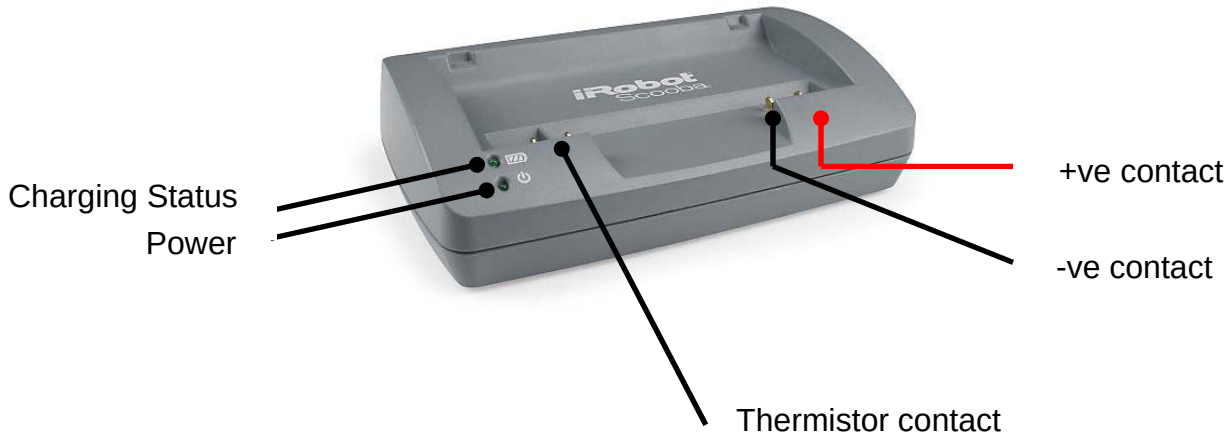
| | | |
|---|---|---|
| Charge<br><br>(finishes current sequence) | | • **Overtemperature:** Battery temperature > 60° C<br>• **Overvoltage:** Battery voltage > 1.8V/cell or >21.6V<br>• **Hi-res voltage dip:** Battery voltage dips > 10mV when above 15V<br>• **Low-res voltage dip:** Battery voltage dips > 60mV |
| Trickle mode<br><br>(keeps battery fully charged) | 11 mA | • **Overvoltage:** Battery voltage > 1.8V/cell or >21.6V<br>• Battery temperature > 42 degrees C |
| Float mode<br><br>(starts after trickle mode aborted) | 0 mA | Both conditions must be true:<br>• Battery temperature < 40 degrees C<br>• Battery voltage < 21.0V |

## Power Supply Troubleshooting

- If the Power Supply light is not on or blinking while charging, first try another wall outlet before replacing the power supply.

## ***Scooba Charger Base***

The Scooba Charging Base is used to charge the Battery and charging takes about three hours. The power light on the Charging Base is an indicator that it is plugged in and operating properly. This light must be on and solid green for the Scooba battery to charge. The battery charging light on the Charging Base signifies that the battery is charging.

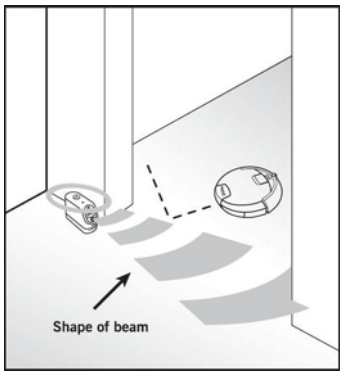


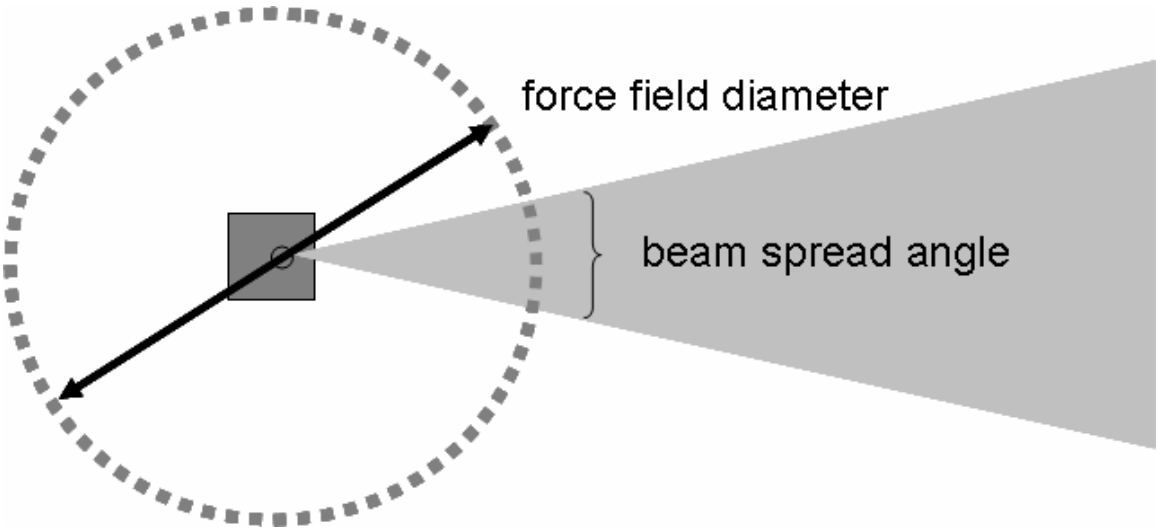

### Charger Base Troubleshooting

| Charger Base Status Light | Battery Status |
|---|---|
| Green pulse | Battery charging |
| Blinks once | Battery is too warm or not installed correctly. |
| Blinks two times | Charger Base failed a self test (charging switch failure). Replace Charger Base. Test Power Supply. |
| Blinks three times | Charger Base failed a self test (servo failure). Replace Charger Base. Test Power Supply. |
| Light Turns Off | Battery is fully charged |

## ***Scooba Virtual Wall***

The Virtual Wall emits an invisible, infrared beam up to 8 feet (~2.5 meters) long that Scooba regards as a barrier and will not cross. The beam spreads out and can get up to 3 feet wide (~1 meter). To avoid infrared interference, do not place the Virtual Wall within 8 feet of a Roomba Home Base. When turned on, the Virtual Wall will turn off automatically after approximately 2.5 hours. The batteries last for about 140 hrs of operations.



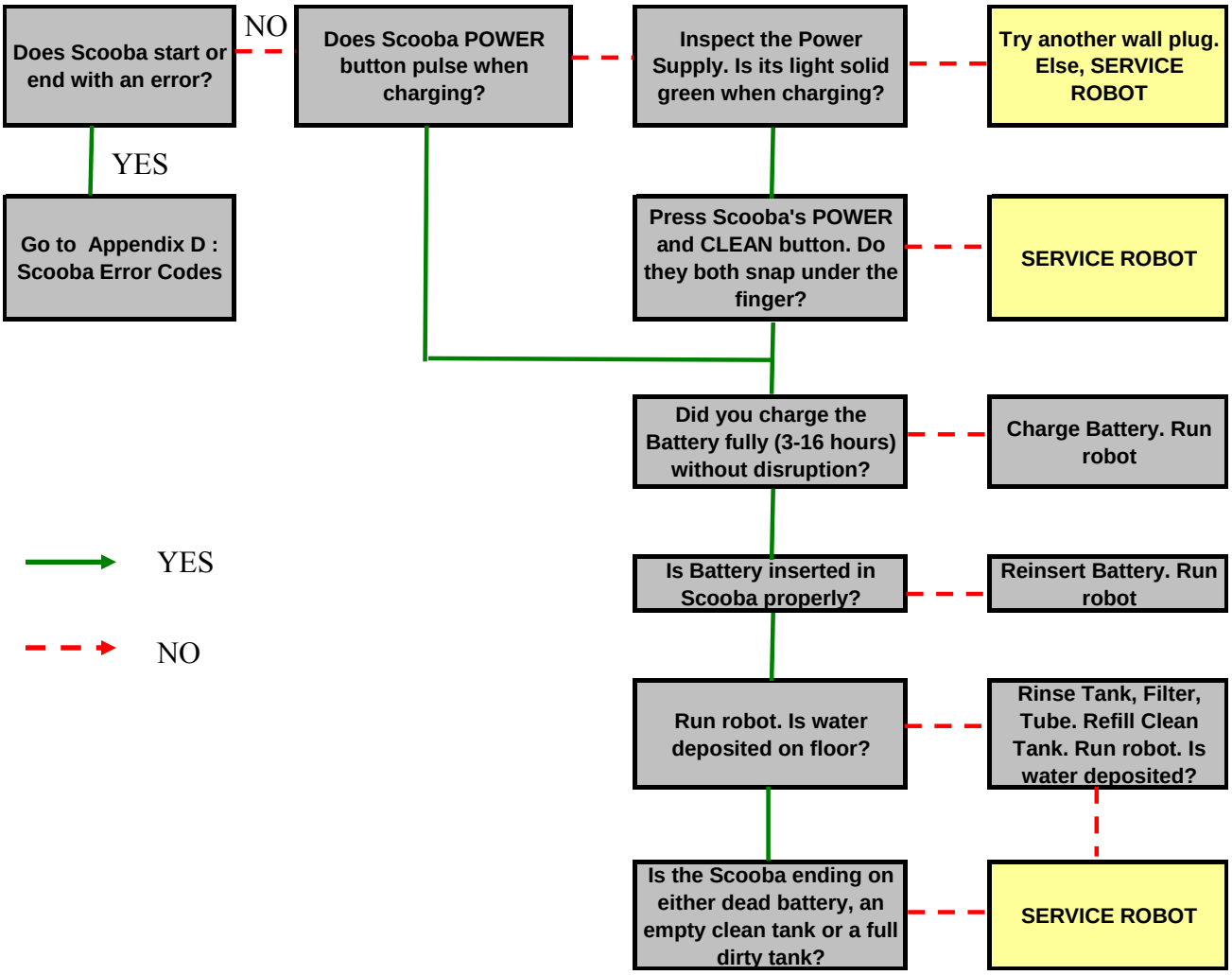



**Top view of Virtual Wall and beam spread**

## Virtual Wall Troubleshooting

- If the Virtual Wall is turned on but the battery status light is off or flashing, the batteries are low. Check the batteries and the virtual battery door. If new batteries still cause issues, do a battery reset. Remove virtual wall batteries and press the power button for 5 seconds. Replace battery.
- If Scooba goes through the virtual wall beam, wipe Scooba's RCON and the infrared field emitter on the Virtual Wall and retest mobility through the beam.
- To test the Virtual Wall strength, set the Scooba in Built-in-Test # 9. Make sure that the Virtual Wall battery status light is on and not flashing. Set the Virtual Wall to the highest setting and bring the Virtual Wall 2.5 meters away from the Scooba bumper. Verify that the 'Check Tank' light is lit and recognizes the Virtual Wall. Repeat this for the lower settings, bringing the Virtual Wall closer for the lowest setting. Reject any Virtual Walls that fail.

# Appendix A: Troubleshooting Flowchart via Telephone


Does Scooba start or end with an error?
NO
Does Scooba POWER button pulse when charging?
Inspect the Power Supply. Is its light solid green when charging?
Try another wall plug. Else, SERVICE ROBOT
YES
Go to Appendix D : Scooba Error Codes
Press Scooba's POWER and CLEAN button. Do they both snap under the finger?
SERVICE ROBOT
Did you charge the Battery fully (3-16 hours) without disruption?
Charge Battery. Run robot
YES
NO
Is Battery inserted in Scooba properly?
Reinsert Battery. Run robot
Run robot. Is water deposited on floor?
Rinse Tank, Filter, Tube. Refill Clean Tank. Run robot. Is water deposited?
Is the Scooba ending on either dead battery, an empty clean tank or a full dirty tank?
SERVICE ROBOT

# Appendix B : User Panel Lights

Note : ‘Pulsing’ means that the light brightens and dims. ‘Blinking’ means the light turns abruptly on and off.

## Service Light

The service light indicates a hard failure that normally requires a replacement to fix.

| Solid Red |
|---|
| o 4 tone alarm followed by a series of beeps. See Appendix H. |

## Power Button and Light

- Powers on/off the robot

| Off | Solid Green | Pulsing Green | Solid Red | Blinking Red |
|---|---|---|---|---|
| o Off<br>o Not charging | o Cleaning<br>o Drying<br>o Battery fully charged | o Charging<br>o If fast pulse then in recharge mode (16 hours) | o Not charging<br>o Battery dead(plays a dead battery song) | o Battery not installed properly<br>o Software not installed properly |

## Clean Button and Light

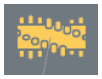
- Starts cleaning cycle
- Starts drying mode
- Stops cleaning mode

| Off | Solid Green | Blinking Green |
|---|---|---|
| o Not powered on<br>o Cycle complete | o Running -Battery charged<br>o Cycle successfully completed | o Drying<br>o Startup<br>o Error conditions – blinks for error and cycle pause conditions |

## Check Tank Light

In normal conditions, the light comes on when the cycle is complete and either the clean Tank is empty or the dirty Tank is full.

| Solid Green |
| --- |
| o Cycle complete<br>o Clean Tank empty<br>o Dirty Tank full<br>o Tank not present |



## Check Brush Light

If the “Check Brush” light comes on make sure the Brush and Filter are correctly installed.

| Solid Yellow |
| --- |
| o Brush not present or stalled<br>o Filter not present<br>o Brush stall |

## I’m Stuck Light

The ‘I’m stuck’ indicates soft failures. Usually moving the robot away from an obstacle and restarting the cycle is the proper corrective action. These normally do not require replacements unless the problem is persistent.

| Solid Yellow |
| --- |
| o “uh-oh” and a series of beeps. See Appendix H. |

# Appendix C: Scooba Serial Number Format

To find the product code for Scooba, open the tank. The product code sticker should appear just below the battery. (There is no need to remove the battery to view the product code.)

| manufacturer ID | | status | model | | | | | year | | month | | day | | revision | | sequence | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | M | U | L | L | L | L | L | Y | Y | m | m | d | d | R | R | s | s | s | s | s |

*e.g. J E N 0 5 8 0 0 0 6 0 1 2 1 0 2 0 0 0 0 1*

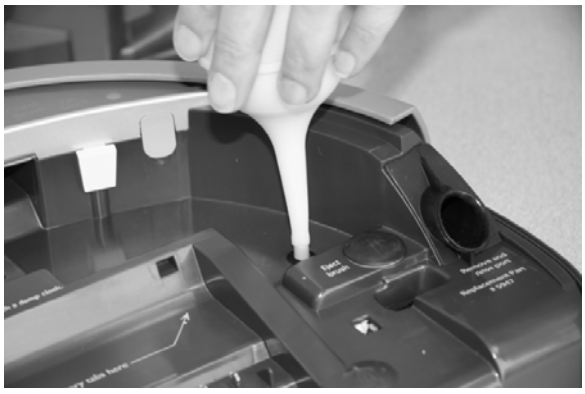
| | |
|---|---|
| MM | Manufacturer ID: 'JE' = Jetta, 'YT' = Kin Yat and 'PR' = PRC |
| U | Status : 'N' = new, 'R' = remanufactured |
| LLLLL | Model number (00000 - 09999) |
| YY | Year (since 2000) this robot was manufactured |
| mm | Month this robot was manufactured |
| dd | Day of the month this robot was manufactured |
| RR | Model revision for this robot<br>o **[01]** = Software Code : **2005-12-13-2046** – implemented 15h Dec 2005<br>o **[02]** = Software Code : **2006-06-09-1200** – implemented 30th Aug 2006<br>o **[03]** = Software Code : **2006-01-29-1253** – implemented 14th Mar 2007<br>o **[04]** = Software Code : **2007-07-06-1452** – implemented 3rd Sep 2007<br>o **[05]** = pump output is 22 ml/min, robot speed is 180 mm/s –23rd Oct 2007 |
| sssss | Sequence |

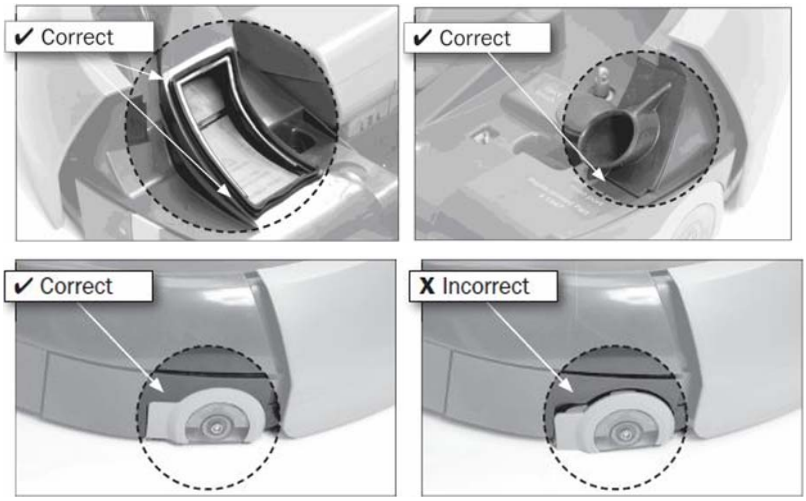
# Appendix D: Scooba Error Codes

| What Scooba Says + What It Means | Ask Customers to do the following : |
|---|---|
| **Dead battery song + POWER button red**<br>• The battery is low and needs recharging | • Do Battery reset. Fully charge Battery in Scooba or Charging Base until fully charged.<br>• In case of battery low, Scooba will complete the dry cycle before stopping and giving error. |
| **"Ehh"**<br>• Cliff sensors are dirty or need repair | • Remove the Tank and turn Scooba over. Check for any dirt underneath the bumper and in the three cliff sensor housings. Use compressed air to blow them out.<br>• Is the front Caster in place? |
| **No beeps**<br>• Wheel is stuck or off the ground | • Remove the Tank and turn Scooba over. Check all three of the wheels, turn them and make sure they are not obstructed and that they can pop in and out. |
| **"uh-oh" + 1 beep**<br>• Wheel drop error | • Remove the Tank and turn Scooba over and inspect the wheels. Replace tires if worn or torn. Push each wheel in/out and turn them for resistance. Remove the front caster and inspect for dirt. Reinsert and make sure it can spin freely, pivots and rotates. Place Scooba back on the floor. Reseat the tank and restart the Clean cycle.<br>• Note : This error can be triggered by a threshold in the environment causing Scooba to get stuck. |
| **"uh-oh" + 2 beeps**<br>• No-bump error (caster error) | • The front wheel may be stuck. Ensure that the front caster can spin freely, pivots and rotates. Remove the caster by pulling it out and clear any dirt. Reinsert the wheel and lightly push the wheel up and down.<br>• Note : This error can also be caused in a large room where Scooba's bumper is not activated over a certain distance. Scooba will do a panic spin every 4.5 meters, four times before shutting down and giving an error. |
| **"uh-oh" + 3 beeps**<br>• Constant bump error | • Tap the bumper to ensure that it moves in and out. Remove Tank and turn Scooba over and visually inspect under the bumper edges for debris. Use compressed air to clean under the bumper. |

| | |
|---|---|
| **"uh-oh" + 4 beeps**<br>• Constant cliff error | • Remove the Tank and turn Scooba over. Clean cliff sensors with a cotton swab or compressed air. Inspect wheels and cleaning head. |
| **"uh-oh" + 5 beeps**<br>• Wheel Stall error | • Left or right wheel malfunction is caused by a wheel, motor or encoder failure. Remove the Tank and turn Scooba over. Inspect Scooba's two drive wheels. Spin the wheels by hand and confirm that they offer some resistance. Dislodge any obstruction and inspect the wheels for damage.<br>• Customer may observe erratic spinning and backing up (a foot at a time in reverse) which is a sign of a bad encoder. |
| **Alarm + 1 beep**<br>• Pump stall | • Go to "Floor is too dry" below (pg 46)<br>• In case of pump/brush stall, Scooba will complete the dry cycle before stopping and giving error. |
| **Alarm + 2 beeps**<br>• Vacuum stall | • If the vacuum motor is abnormally loud, replace the vacuum.<br>• Ensure the Filter is not broken, allowing dirt to enter the fan. |
| **Alarm + 3 beeps**<br>• Battery over current while running | • Replace Battery. |
| **Alarm + 4 beeps**<br>• Power Supply has failed | •Need to test the Power Supply and Scooba. |
| **Alarm + 5 beeps**<br>• Battery is too hot while charging | • Wait for the Battery to cool down and try again.<br>• Note: Make sure Scooba was not recently filled with hot water or charged with the tank closed and in a hot environment. |

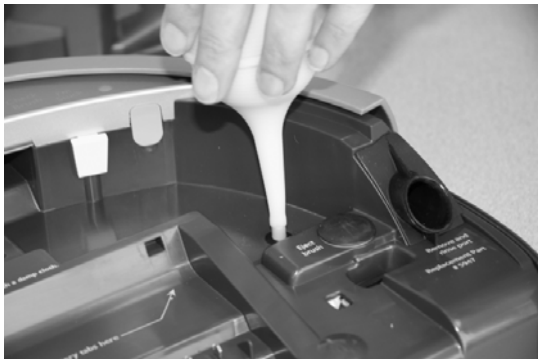
**User Interface Errors**

| | |
|---|---|
| **Power button off**<br>• User interface failure | • With the Battery removed, press POWER button and confirm that it snaps under the finger like the CLEAN button. If not, user panel needs to be replaced.<br>• Reinsert the Battery and start charging the Battery in Scooba. If the power light does not illuminate, the Battery could be entering deep discharge mode. Wait a few minutes and see if the power light comes on. If a green light starts pulsing fast, it is in deep discharge mode. If still no light, Scooba needs to be repaired for possible charging or user interface problem. Perform a full Built–in-Test. |
| **Check Tank**<br>• Tank missing<br>• Clean Tank empty<br>• Dirty Tank full.<br>• Pump - sticky valve<br>• Water too soft | • Is the **Tank** missing, the **clean Tank** empty, or **dirty Tank** full?<br>• Use the Scooba Bulb on the solution valve and squeeze air through the pump 3 times.<br>  <br>• Rinse out the clean and dirty Tank with some water.<br>• If the problem persists, empty Tank and add a mixture of water and 60 ml of vinegar in the clean tank water to increase the conductivity of the water. Then use the Scooba bulb to push air through the water sensor and clear the tubes. Then reinsert Tank with the fresh water/vinegar mixture. |

| | |
|---|---|
| **Check Brush**<br>• Brush stall<br>• Filter missing<br>• Cleaning Head missing | • Check that the Filter, Vacuum Flow Tube, Cleaning Head are properly seated. Remove and reinsert them.<br>  <br>• <u>In case of brush stall, Scooba will complete the dry cycle before stopping and giving error.</u> |

**Behavior only**

| | |
|---|---|
| **Tank won't open** | • Place one hand on the tank Receiver and apply pressure on the back while the other hand taps lightly on the edge of the Tank handle. The tank should release. |
| **Tank won't close** | • Make sure there are no obstructions<br>• Make sure the Battery, Vacuum Flow Tube and Filter are seated properly<br>• Ensure the user is placing enough pressure on the top of tank when closing it. |
| **Floor too wet**<br>• Clogged ports<br>• Bad squeegee<br>• Bad tank seal | • Is the user letting the 5 minute drying cycle complete? The dry cycle is not intended to dry the floor but dry the internal tubing in the Scooba so it does not leave a puddle on the floor.<br>• Rinse out the Filter, and all ports on the underside of the Scooba Tank since they may be clogged.<br>• Ensure that all the squeegees (dry and wet) are not ripped or bent. If the dry vacuum squeegee is rippled or bent, you can take some dish soap between your thumb and index finger and run it along the squeegee to straighten it out. |

| | |
|---|---|
| | |
| **Floor too dry**<br>• Sticky valve<br>• Bad tank seal | • Note : A blinking CLEAN light signifies it is in dry mode and no water is being placed on the floor<br>• Use the Scooba Bulb on the solution valve and squeeze air through the pump 3 times.<br>  <br>• Ensure there is liquid in the clean Tank.<br>• Make sure the Battery is in place with the yellow tabs tucked into the battery latch. Ensure the Tank is properly latched into robot<br>• Ensure the Filter and Vacuum Flow Tube are properly installed.<br>• Fill clean Tank. Using a pen tip, push on the poppet valve to ensure a flow is coming out. Test over sink. |

| | |
|---|---|
| **Charging Failure** | • Is the Battery properly seated?<br>• Is the Power Supply light off or flashing? If yes, Scooba and the Power Supply may need to be replaced. Perform full Built-in-Test. |
| **Short run time (<60 min)** | • Make sure Scooba does not end in an error code.<br>• Do a Battery Reset : Remove power to robot. Take out battery and press power for 5 seconds. Reseat battery and make sure that it is seated properly. Wait 5 seconds and reattach to power supply.<br>• Charge Battery fully (3 – 16 hours)<br>• Although the tank may end clean cycle after 45 minutes, the battery should last for another tank and run total of 60minutes. |
| **Gets stuck on transitions** | • Scooba can only clear 3 mm transitions. Anything larger will cause the bumper to turn the Scooba away. |

# Appendix E: Scooba OSMO

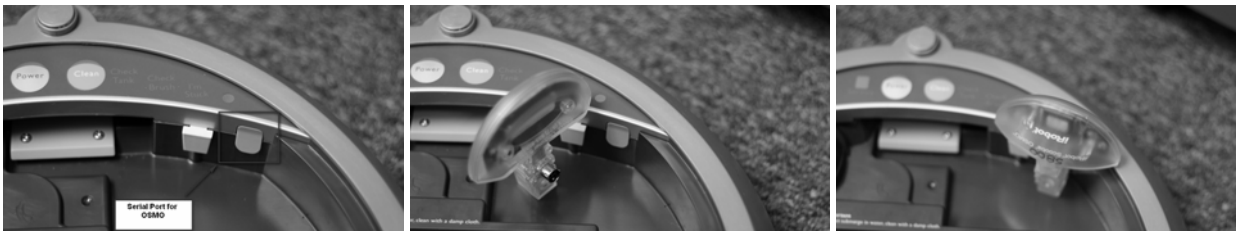
Scooba's software is continuously improved by iRobot software engineers. When a Scooba is serviced it is best practice to update it with the latest software code with an OSMO. OSMO will only update software if the robot's software is an older version than what is installed in OSMO.

| Software Date Tag | Robot Production Implementation | Notes | Scooba OSMO |
|---|---|---|---|
| **2007-07-06-1452** | **3 September 2007** | **Universal code** (can be applied to any Scooba model) | |

## OSMO Download Procedure

The OSMO download takes about 2 minutes and requires battery power during the download. OSMO will first delete the robot's operating system before downloading new software and if the battery dies during the download, the robot remains without an operating system. In this case the robot's POWER light will blink red until the software is properly loaded again.

OSMO is very easy to install, please follow the steps below.




1. Remove the power supply.
2. Attach a charged Battery into your Scooba.
3. Line the OSMO up so the serial connector is facing towards the serial port.
4. Once plugged in, the OSMO and the Scooba's power light will flash for a couple of minutes and then the power light will turn solid green.
5. Remove OSMO. The upgrade is now complete!

# Appendix F: Scooba Built-in-Test

*[A Serial Cable can not be attached to Scooba during Built-in-Test]*

## Scooba Built-in-Test Procedure

To put Scooba into Built-in Test mode:

1. Power Scooba OFF (if not already OFF) by pressing the POWER button.
2. Hold down the CLEAN button.
3. Power Scooba ON by pressing and releasing the POWER button.
4. Keep holding down the CLEAN button for about 0.5 SECONDS until you hear a series of ASCENDING BEEPS and the user panel LEDs start flashing.

For AUTO-ADVANCE mode:

5. Release the CLEAN button.

For MANUAL-ADVANCE mode:

6. Continue holding down the CLEAN button for a total of 3 SECONDS until you hear a second series of DESCENDING BEEPS.
7. Release the CLEAN button.

| | **Test Name** | **Tester Action** | **Robot Action** | **(Left) Check Tank LED** | **(Middle) Check Brush LED** | **(Right) I'm Stuck LED** | **Power LED's** |
|---|---|---|---|---|---|---|---|
| 0 | Panel LEDs | Check correct flashing of LEDs. Press CLEAN to advance to the first test. | | | | | |
| 1 | External Watchdog Test | None [this test makes sure that the processor can reset if it gets locked up] | All LED's will go out briefly and then return to normal state. | External watchdog test passed. | | | |
| 2 | Bumpers + board-rev | Press and release left bumper. Press and release right bumper. | | Left bumper pressed. | Board rev ID OK (>=3) | Right bumper pressed. | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3 | Side Cliff Sensors | Briefly lift robot's left side to simulate cliff-left. Briefly lift robot's right side to simulate cliff-right. | | Cliff-left detected. | | Cliff-right detected. | |
| 4 | Front Cliff + Wall Sensors | Briefly lift front of robot to simulate cliff-front. Briefly simulate a wall. | | Cliff-front detected. | | Wall detected. | |
| 5 | Side Wheel Drops | Lift robot for one second to cause a wheel drop on left wheel, then do the same for the right wheel. | | Left wheel drop detected. | | Right wheel drop detected. | |
| 6 | Front wheel drop + stasis. | Briefly lift robot to cause a wheel drop on the caster. Spin caster while dropped and verify that lights do not change. Hold the robot so it's resting on just the front caster (holding the other wheels in the air). Move the robot forward one foot to cause the stasis switch to activate at least 3 times. | | Caster wheel drop detected. | | Stasis switch status. | |
| 7 | Tank, filter, + cleaning head present switches. | Remove the tank. Briefly remove and re-insert the filter. Briefly remove and re-insert the cleaning head. Re-insert the tank. | | Tank removal detected. | Filter removal detected. | Cleaning head removal detected. | |
| 8 | Light sensor | None. Test automatically passes for Scoobas without light sensors. Tester can skip by pressing 'clean' button | | Light sensor sees darkness. | | Light sensor sees brightness. | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9 | Rcon IR Receiver | Point a virtual wall at the rcon IR receiver. Then point the virtual wall away or turn it off.<br>Point a Roomba remote control at the rcon IR receiver and briefly press any button except Power. | | Virtual-wall signal at rcon IR receiver. | | Remote signal at rcon IR receiver | |
| 10 | Main Brush | Make sure brush is unobstructed. Wait until POWER LED is constantly GREEN for 1 second. Then stall the main brush until Check tank LED is constantly yellow for 1 second. | Main brush turns on. | Brush overcurrent stall. | | | Brush current OK. |
| 11 | Vacuum | None. | Vacuum turns on. | Vacuum stall. | | | Vacuum current OK. |
| 12 | Pump | None. { If it fails, use a Scooba bulb to push air through the pump } | Pump turns on. | Pump stall. | | Good pump encoder signal. | Pump current OK. |
| 13 | Tank level sensors | Ensure tank is inserted and empty. Wait 5 seconds until middle LED lights. Remove tank. Add a tank with some liquid in the clean and dirty tank and insert in Scooba. Wait for clean tank sensor light to activate. Tilt the robot if necessary to light the dirty tank light. | Pump turns on. | Clean tank level sensor active (IE sees water). | Lights when the test is waiting for the tester to remove the tank & fill it. | Dirty tank level sensor active (IE sees water). | |
| 14 | Left Wheel | Make sure wheels are in the air and unobstructed. Wait until POWER LED is constantly GREEN. Then stall left wheel until Check tank LED is constantly yellow for 1 second. | Left wheel turns in forward direction | Left wheel overcurrent stall. | | | Left motor current and encoder speed OK. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 15 | Right Wheel | Make sure wheels are in the air and unobstructed. Wait until POWER LED is constantly GREEN. Then stall right wheel until Check tank LED is constantly yellow for 1 second. | Right wheel turns in forward direction. | | | Right wheel overcurrent stall. | Right motor current and encoder speed OK. |
| 16 | Wheel Encoders | Robot will drive backwards for 1 seconds, verify that robot drives straight. | Drive wheels turn in backward direction. | Left wheel encoder signal. | | Right wheel encoder signal. | Motor current and encoder speed OK. |
| 17 | Charger detection | Plug in the charger. | | Charger detected | | | |
| 18 | Battery Sensors | None | | Battery voltage between 12 - 18 V. | | Thermistor present. | Baseline current OK. |
| 19 | Plug-in Charger Trickle. | None | | Plug-in charger available. | | | Trickle current OK. |
| 20 | Plug-in Charger Low Current. | None | | Plug-in charger available. | | | Low charge current OK. |
| 21 | Plug-in Charger High Current | None | | Plug-in charger available. | | | High charge current OK. |
| 22 | Charger Watchdog Test | None [again, this test checks that we stop charging if the processor locks up] | | Plug-in charger available. | | Charger watchdog test passed | |
| 23 | Charger switch isolation test | None [this tests two switches on the main board, electronically between battery and charger. Redundant protection in case we need to switch charging off] | Charging current only passes when both switches are enabled. | Plug-in charger available. | | Charger switch isolation test passed | |
| 24 | SW Version | None [this test verifies that the software is protected and cannot be read] | | SW Version OK? | | | |
| 25 | Built-in test Complete | | | | | | |

## iRobot Data Capture

1. Run “iRobot_BiT_CaptureV1.1.exe”. If the program has not yet been downloaded, extract the zip file into a folder making sure ‘RobotOriginList.txt’ file is in the same folder as the executable.
2. Choose the robot Model.
3. Create or select the file to write the bit data into using ‘Browse’ button. Now enter the serial number of the robot from the robot sticker. The serial number has the following verifications: Length is 21, Starts with “JEN” or “jen”, “KYN” or “ kyn”, “PRR” or “prr”
4. Choose the origin from where the robot was shipped
5. Choose the mobility test result
6. Choose the com port you are using to connect to the robot and press ‘Capture’
7. After performing the BiT test, connect the robot to the com port selected in step 6.
8. Press ‘Clean’ button on the robot to get the BiT data
9. If you do not get data within 5 secs, press clean again
10. The BiT summary data will be displayed and will be automatically saved into the file
11. You can continue to another robot without closing the program. Repeat steps 3-10

**NOTE 1:** If robot model needs to be changed, re-start the application
**NOTE 2:** Please do not edit/open the ‘RobotOriginList.txt’ file. If you want to edit the robot ‘shipped from’ details, use the ‘…’ button to edit the drop down list.

## Alternative Data Capture (without iRobot software)

[Note : When the Built-in-Test is completed, the Scooba’s POWER light will be flashing GREEN (it passed) or RED (it failed). Do not remove the Battery as this will erase the test information.]

- Plug in the serial cable from the robot into COM1 or COM2 of the computer.
- Open HyperTerminal
    - (In Windows) START ->Programs -> Accessories -> Communications -> HyperTerminal …or…
    - (In Windows) START->RUN and enter HYPERTRM.EXE
- Name the connection (anything you want)
- Choose COM1 or COM2 depending on where you attached the cable into the computer.
- Select bits per second and change to “57600”and under flow control select “none” (leave all other settings alone).
- In "HyperTerminal" go to TRANSFER -> CAPTURE TEST -> START
- Press Clean on Scooba
- In "HyperTerminal" go to TRANSFER -> CAPTURE TEST -> STOP

Serial cable available from iRobot :

# Appendix G: Scooba Built-in-Test Limits

The following are the minimum and maximum limits used in each Built-in-Test.

| Relevant Scooba BiT # | Description | MINIMUM | MAXIMUM |
|---|---|---|---|
| 10,11,12,14,18 | Baseline Current | -195 mA | -68 mA |
| 10 | Brush Current | -683 mA | -166 mA |
| 10 | Brush Stall Current | -3251 mA | -1894 mA |
| 11 | Vacuum Current | -2060 mA | -1376 mA |
| 12 | Pump Current | -97 mA | -19 mA |
| 12 | Pump Stall Current | -303 mA | -117 mA |
| 14 | Left Drive Current | -205 mA | -39 mA |
| 14 | Left Drive Stall Current | -1406 mA | -585 mA |
| 15 | Right Drive Current | -205 mA | -39 mA |
| 15 | Right Drive Stall Current | -1406 mA | -585 mA |
| 18 | Battery Voltage | 12V | 18V |
| 19 | Charging Trickle Current (nominal 49 mA) | 29 mA | 68 mA |
| 20 | Charging Low Current (nominal 430 mA) | 390 mA | 468 mA |
| 21 | Charging High Current (nominal 1750 mA) | 1572 mA | 1923 mA |
| 22 | Charging Disabled Current | -253 mA | 0 mA |
| 23 | Charging Switch 1 & 2 Disabled Current | -253 mA | 0 mA |

# Appendix H: Battery Test Procedure

| **Using Battery Voltage Tester** | |
|---|---|
| *Objective :* | To measure voltage across a Scooba battery, to measure voltage across a 5-Ohm resistor, and to measure the thermistor resistance. |
| *Equipment :* | Battery Voltage Tester, Multimeter, and fully charged battery under test. |

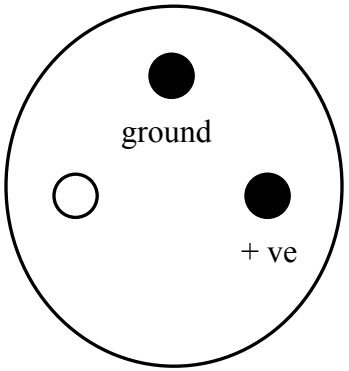
**Method**

| | |
|---|---|
| 1. | Fully charge battery with Scooba or Charger Base. Insert battery into tester. |
| 2. | To measure voltage across the battery, set the multimeter to measure DC VOLTAGE (**V**), and plug the multimeter terminals to the positive (red+) and negative (black-) terminals of the battery tester. **Failure if** reading is not between 15.5 – 18V. |
| 3. | To measure the voltage across a 5 Ω resistor, follow step 1 and press the 5-Ohm resistor push button (Caution: Do not press button for more than a few seconds to avoid overheating of the load. **Failure if** voltage drop is more than 2 Volts. |
| 4. | To measure the thermistor resistance value (thermistor contact to ground contact), set the multimeter to measure RESISTANCE (**Ω**), and plug the multimeter terminals to the thermistor terminal and the negative (-) terminal. **Failure if** not within specs in table below. |

| Ambient Room Temp | Thermistor Min (K Ohm) | Thermistor Max (K Ohm) |
|---|---|---|
| **10 to 17 C** | 10.26 | 7.235 |
| **18 to 25 C** | 6.955 | 5 |
| **26 to 33 C** | 4.777 | 3.5 |
| **34 to 41 C** | 3.352 | 2.489 |

# Appendix I: Power Supply Test Procedure

| For 1.75A International Power Supply | |
|---|---|
| *Equipment:* | AC Voltmeter, DC voltmeter, ammeter, variable voltage AC supply, |
| **Method 1** | |
| 1. | Plug power supply into variable voltage AC supply with AC voltmeter connected across AC supply. |
| 2. | Set AC supply voltage for 85 VAC. **Failure if** DC output voltage < 21.5 VDC or > 24 VDC; or **light** is off |
| 3. | Set AC supply voltage for 264 VAC. **Failure if** DC output voltage < 21.5 VDC or > 24 VDC; or **light** is off |
| 4. | Disconnect power supply from AC supply. Set AC supply voltage for 65 VAC. Reconnect power supply to AC supply. **Failure if** output current isn't zero (power supply should shut down) or **light** is off |
| **Method 2** | |
| 1. | Plug power supply into wall socket. **Failure if** DC output voltage < 21.5 VDC or > 24 VDC; or **light** is off |



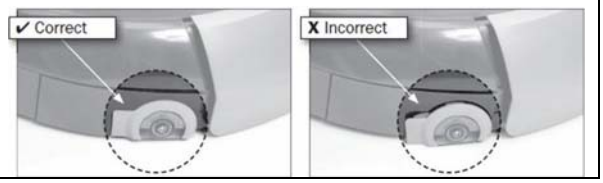
# Appendix J: Suggested Maintenance Procedure

## Scooba Dry Vacuum Squeegee Replacement

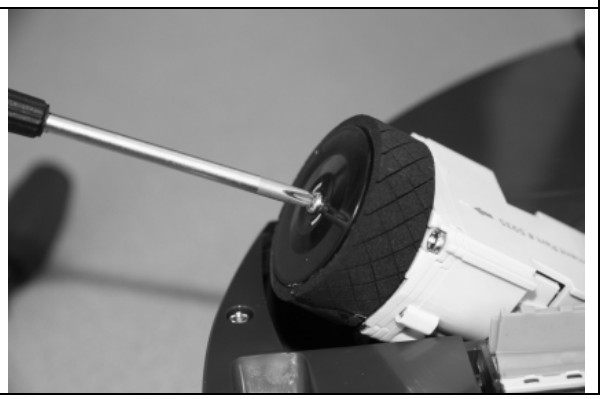
| | | |
|---|---|---|
| **1** | Turn Scooba over and remove the bracket that holds in the dry vacuum squeegee. | |
| **2** | Pull our short squeegee and replace. | |
| **3** | Pull out the long squeegee and replace. | |

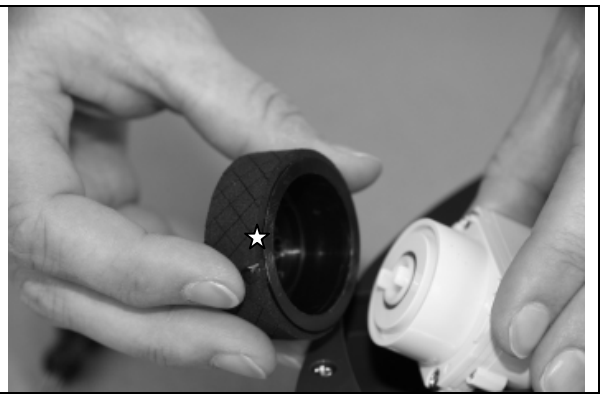
## Scooba Cleaning Head Disassembly

| | | |
|---|---|---|
| **1** | Open Cleaning Head by using the two tabs on the edge of the frame. | |
| **2** | Open Cleaning Head to expose and remove the Brush. Clean the Brush. | |
| **3** | Close Cleaning Head and reinsert it into Scooba by first aligning the frame with the chassis. | |

| | | |
|---|---|---|
| **4** | Push in the Cleaning Head until it clicks into place. | <br>  |

## Scooba Wheel Replacement

| | | |
|---|---|---|
| **1** | With Scooba turned over, press on the two tabs on the bottom of the wheel and pull up. | |
| **2** | Remove the tire if needed with a screwdriver (one screw per wheel). |  |

| | | |
|---|---|---|
| | |  |

## Scooba Chassis Disassembly

1. Remove battery, tank, filter and suction port

2. Remove bumper (2 screws)

Clean with a damp cloth only
-Do Not Submerge-
-Do Not Spray-
For replacement parts or questions, visit www.irobot.com/support

3. Remove screws in lower chassis (10 screws)

Clean with a damp cloth only
-Do Not Submerge-
-Do Not Spray-
For replacement parts or questions, visit www.irobot.com/support

4. Remove screws along user panel (6 screws)

5. To open chassis cover, do the following :
   - Remove white flexible cable by pulling it out of user panel.
   - Push suction valve down as chassis top is removed.

# Appendix K: Glossary

| | |
|---|---|
| BiT | o Built-in-Test |
| Chassis | o The plastic frame of the Scooba |
| Encoder | o A sensor that relays information to the robot |
| Force Field | o An IR avoidance beam that ensures the Scooba does not bump into it. Force field is used in the Home Base and Virtual Wall |
| Infra Red (IR) | o Light with wavelengths greater than those of visible light. |
| Light Emitting Diode (LED) | o Semiconductor light source that emits visible light or invisible infrared radiation. |
| Mobility | o Capable of moving or being moved readily |
| Overcurrents | o Exceeds the current limits for the motors. |
| PCB | o Printed circuit board |
| RCON | o Room confinement (reference to the IR receiver eye on the top of the outer bumper) |
| Squeegee | o A flat, smooth rubber blade, used to remove or control the flow of liquid on a flat surface |
| Stasis | o Refers to things that are not moving or changing |
| User Interface (UI) | o The physical means and method of interaction between users and products |
| Virtual | o Not physical |